Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity

R-1 Program Element (Number/Name)

2040: Research, Development, Test & Evaluation, Army I BA 5: System

PE 0604820A I Radar Development

Development & Demonstration (SDD)

COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	11.821	15.983	32.968	-	32.968	31.761	51.897	72.562	81.351	Continuing	Continuing
E10: Sentinel	-	11.821	15.983	32.968	-	32.968	31.761	51.897	72.562	81.351	Continuing	Continuing

A. Mission Description and Budget Item Justification

This system is a component of the overall Air and Missile Defense (AMD) architecture and will provide for an incrementally fielded Integrated Air and Missile Defense Fire Control System/capability for the composite Army Air and Missile Defense Brigades. The Sentinel system is used with the Forward Area Air Defense Command and Control (FAAD C2) element and is a key component to the Integrated Air and Missile Defense (IAMD) architecture via the IAMD Battle Command System (IBCS) to provide critical air surveillance of the forward areas.

The Sentinel currently consists of two primary variants: the AN/MPQ-64A1 system mounted on a High Mobility Multi-purpose Wheeled Vehicle (HMMWV), and an enhanced radar variant, the AN/MPQ-64A3 mounted on a 2.5 ton trailer and towed by an armored Family of Medium Tactical Vehicle (FMTV) platform. A pure fleet of FMTV configuration AN/MPQ-64A3 assets will be complete in FY19. Sentinel also consists of Identification Friend or Foe (IFF), and Forward Area Air Defense (FAAD) Command, Control and Intelligence (C2I) interfaces. The radar is deployed in both an air defense role and a force protection role for Counter-Rocket, Artillery, and Mortar (C-RAM) missions. The sensor is an advanced three-dimensional battlefield X-Band air defense phased-array radar with an instrumented range of 75 kilometers. Sentinel is capable of operating day or night, in adverse weather conditions, in the battlefield environments of dust, smoke, aerosols and enemy countermeasures. It provides 360-degree azimuth coverage for acquisition tracking. Sentinel contributes to the digital battlefield by automatically detecting, classifying, identifying and reporting targets (cruise missiles, unmanned aerial systems, rotary wing and fixed wing aircraft). Sentinel acquires targets sufficiently forward of the battle area to allow weapons reaction time and engagement at optimum ranges. Sentinel's integrated IFF reduces the potential for fratricide of US and Coalition aircraft.

The Research and Development funding supports Sentinel modernization/upgrades, hardware/software issue resolution, resolution of obsolescence issues, engineering studies, and cost reduction initiatives. The funding for Fiscal Year (FY) 2016 through FY 2022 development activities addresses the following Sentinel system capability gaps and obsolescence issues identified by the User: 1) Target Detection gap; 2) Target Tracking gap; 3) Net Readiness gap; 4) Electronic Counter Measures (ECM) gap; 5) Unmanned Aerial Systems (UAS) Defense gap; and 5) Rockets, Artillery & Mortars (RAM) gap.

Cross Domain Solution (CDS) Network Interface addresses net readiness and system security concerns. This effort develops a CDS interface to isolate the Sentinel radar from connected networks of lower classification levels. Allows for ongoing cyber security initiatives to be reviewed and addressed as they arise. Ensures that Information Assurance/Cyber security is part of Sentinel operations, missions and functions. Makes certain that practices necessary to ensure the protection of information and personnel are instituted.

Electronic Attack/Electronic Protect (EA/EP) addresses the electronic countermeasures (ECM) gap. This effort conducts additional design and testing to verify initial EA/EP results and updates the database and associated software and hardware with more extensive EA/EP signatures to address evolving threats. Addresses further EP modifications and methods to be determined based on analysis of results.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	
2040: Research, Development, Test & Evaluation, Army I BA 5: System	PE 0604820A I Radar Development	
Development & Demonstration (SDD)		

Signal Data Processor (SDP)/North Finding Module (NFM) addresses the Target Detection, Target Tracking, and Electronic Countermeasures (ECM) capability gaps and funds the mitigation of the SDP and NFM obsolescence issues. SDP cards are estimated to go obsolete every four to six years. Provides for new SDP kit to address obsolescence issues and allow for additional Electronic Protect capability.

Medium Bandwidth Waveform upgrade will address latent tracking issues that currently exist with Sentinel in certain applications. This development effort modifies firmware as well as software in the Sentinel radar. This effort will provide better target resolution and more accurate tracking in the slant range coordinate. This improved target resolution and tracking accuracy will provide improved retention of target identification and more robust tracking that addresses the latent tracking issues.

Mode S upgrade to existing Sentinel Identification Friend or Foe (IFF) will address Sentinel's objective requirement to interrogate IFF mode S which is currently not being met. Mode S transmissions are a key component of the Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance technology being used by the Federal Aviation Administration for tracking aircraft as part of the Next Generation Air Transportation System (NextGen). In the United States, all aircraft required to have transponders (most aircraft) must transition to Mode S capable units by 2020. Without the Mode S upgrade, Sentinel will have to rely on these aircraft transponders responding to the legacy mode 3/A interrogations. The data available in the Mode S response will be valuable in identifying the aircraft and correlating Sentinel tracks with civil aviation tracks/data and other track data sources. Addresses Mode M Global Positioning System (GPS) capability requirement with the new interrogator.

The Active Electronically Scanned Array (AESA) (Sentinel A4) is the next generation of radar technology to replace the current phase and frequency scanned array used by Sentinel today. The AESA Antenna will provide increased capability including extended range for ground-based surveillance and situational awareness, faster and more accurate Non-Cooperative Target Recognition (NCTR) for clearing fires and preventing fratricide, improved Fire Control (FC) quality track accuracy, and management of larger track loads. The AESA will also provide improved operation in severe/urban clutter. The system will detect and track small targets, such as Unmanned Aerial Systems (UAS) and Cruise Missiles, in clutter and will detect and track slow targets, such as UAS and Rotary Wing (RW) aircraft, at low altitudes in clutter. The system will detect, track, and classify Rocket, Artillery, and Mortar (RAM) threats and will support Integrated Air and Missile Defense Battle Command System (IBCS) requirements and can contribute sensor support for mitigating current and future Indirect Fire Protection Capability Increment 2 mission requirements.

Sentinel Systems: Software Development in support of a system of systems architecture (IAMD and IFPC Inc 2-I) for a required simulation capability. The simulation capability will add a high fidelity representation of Sentinel to IAMD to allow for optimum engagement management and mission planning. Supports Sentinel Digital Simulation Software (SDS/SENTSIM) development efforts for testing of future capabilities. Includes software development for Low Slow Small in a test fix test environment as well as integration and testing of the IAMD B kit on board the Sentinel FMTV platform.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army

Date: May 2017

Appropriation/Budget Activity

2040: Research, Development, Test & Evaluation, Army I BA 5: System

Development & Demonstration (SDD)

R-1 Program Element (Number/Name)
PE 0604820A I Radar Development

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	12.309	15.983	20.844	-	20.844
Current President's Budget	11.821	15.983	32.968	-	32.968
Total Adjustments	-0.488	0.000	12.124	-	12.124
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
 Congressional Adds 	-	-			
 Congressional Directed Transfers 	-	-			
Reprogrammings	-	-			
SBIR/STTR Transfer	-0.488	-			
 Adjustments to Budget Years 	0.000	0.000	12.124	-	12.124

Change Summary Explanation

FY 2018 funding adjustment to allow for analysis and development of the follow on Active Electronically Scanned Array (AESA) technology and to address electronic protect. Supports Sentinel Digital Simulation Software (SDS/SENTSIM) development efforts to add a high fidelity representation of Sentinel to IAMD to allow for optimum engagement management and mission planning. Includes software development for Low Slow Small in a test fix test environment as well as integration and testing of the IAMD B kit on board the Sentinel FMTV platform.

PE 0604820A: Radar Development

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Exhibit R-2A, RDT&E Project Ju	Exhibit R-2A, RDT&E Project Justification: FY 2018 Army													
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604820A / Radar Development PE 10 / Sentinel						/Name)		
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost		
E10: Sentinel	-	11.821	15.983	32.968	-	32.968	31.761	51.897	72.562	81.351	Continuing	Continuing		
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-				

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (No	umber/Name)
2040 / 5	PE 0604820A I Radar Development	E10 / Senti	inel

Signal Data Processor (SDP)/North Finding Module (NFM) addresses the Target Detection, Target Tracking, and Electronic Countermeasures (ECM) capability gaps and funds the mitigation of the SDP and NFM obsolescence issues. SDP cards are estimated to go obsolete every four to six years. Provides for new SDP kit to address obsolescence issues and allow for additional Electronic Protect capability.

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B. Accomplishments/Planned Programs (\$ in Millions)			FY 2018	FY 2018	FY 2018
	FY 2016	FY 2017	Base	oco	Total
Title: Product Development	8.582	13.047	28.182	-	28.182
Description: Funding is provided for the following efforts:					
FY 2016 Accomplishments:					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army				Date: May 2017						
, · · · · · · · · · · · · · · · · · · ·	Program Element (Number/Nam 0604820A <i>I Radar Development</i>	ne)		Project (Number/Name) 10 / Sentinel						
B. Accomplishments/Planned Programs (\$ in Millions)	FY	Y 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total				
Integrated firmware, software and hardware. Designed and built prototype subsyste testing. Completed software code coding and modification of the system search ar mapping, and waveforms. Characterized performance, design & replaced firmware Performed technical assessments, concept studies, cost reduction, risk reduction, to documentation for modifications to address evolving threats.	nd track logic, clutter e, software and hardware.									
FY 2017 Plans: Integrate firmware, software and hardware. Design and build prototype subsystems Complete software code coding and modification of the system search and track lo waveforms. Characterize performance, design & replace firmware, software and has assessments, concept studies, cost reduction, risk reduction, threat analysis, and relinitiate analysis of technology, program documentation and development of contract support of follow on sensor technology.	gic, clutter mapping, and ardware. Perform technical equired documentation.									
FY 2018 Base Plans: Integrate firmware, software and hardware. Design and build prototype subsystems Complete software code coding and modification of the system search and track lo waveforms. Characterize performance, design & replace firmware, software and hassessments, concept studies, cost reduction, risk reduction, threat analysis, and recontinue analysis of technology, program milestone documentation, development of packages and proposal evaluation activities in support of Active Electronically Scatechnology. Support University Affiliated Research Centers (UARC) modeling and development efforts in preparation for evaluating AESA. Support Sentinel Digital Si SENTSIM) development efforts for testing of future capabilities. Software development at test fix test environment as well as integration and testing of the IAMD B kit on platform.	gic, clutter mapping, and ardware. Perform technical equired documentation. of contract requirement nned Array (AESA) analysis as well as lab mulation Software (SDS/ nent for Low Slow Small									
Title: Test & Evaluation		2.191	1.576	4.786	-	4.786				
Description: Funding is provided for the following efforts:										
FY 2016 Accomplishments: Conducted software qualification test and hardware verification testing as well as firepresentative targets. Prepared logistics products and required documentation for and hardware upgrades.										
FY 2017 Plans:										

				UNCLAS	SILIED						
Exhibit R-2A, RDT&E Project Just	tification: FY	2018 Army							Date: May	/ 2017	
Appropriation/Budget Activity 2040 / 5						nent (Numbe dar Developr		Project (N E10 / Sent		me)	
B. Accomplishments/Planned Pro	ograms (\$ in I	Millions)					FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Conduct software qualification test a Prepare logistics products and requ											
FY 2018 Base Plans: Conduct software qualification test a Prepare logistics products and requ Final integration and testing of IAMI	ired documen	tation for ma	ateriel releas								
Title: Management Support							1.048	1.360	_	_	-
the accomplishments and plans for FY 2016 Accomplishments: Provided government management, FY 2017 Plans: Provides government management,	, technical and	d administrat I administrat	tive support i	n FY 2016. n FY 2017.							
			Accomplisi	hments/Plar	nned Progra	ms Subtota	ls 11.821	15.983	32.968	-	32.96
C. Other Program Funding Summ	ary (\$ in Milli	ons)	FY 2018	FY 2018	FY 2018					Cost To	
<u>Line Item</u> • PE 0605456A: <i>Proj PA3,</i> PAC-3/MSE MISSILE	FY 2016 2.201	FY 2017 -	Base	<u>OCO</u>	Total	FY 2019 -	FY 2020 -	FY 2021 -	FY 2022 -	Complete 0	Total Cos 2.20
SSN C53101: MSE Missile	514.946 61.653	702.201	459.040 78.926	-	459.040 78.926	499.915 80.314	540.669 109.222	523.413 112.614		Continuing	
• PE 0205456: Proj EF9, System Integration and Test	01.003	73.417	78.926	-	78.926	80.314	109.222	112.014	123.007	Continuing	Continuin
• PE 0604114A: Proj EX2; Lower Tier Air Missile Defense (LTAMD) Capability	-	35.132	76.728	-	76.728	67.088	83.195	114.185	142.000	Continuing	Continuin
SSN C50016: Lower Tier Air and Missile Defense (AMD)	130.275	126.470	140.826	-	140.826	125.161	144.243	119.282	121.825	Continuing	Continuin
 PE 0604319A: Proj DU3, IFPC2 (FY12 PE0603305A IFPC II - Intercept) 	149.222	-	31.303	-	31.303	52.604	239.305	259.804	316.104	Continuing	Continuin

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Exhibit R-2A, RDT&E Project Justi	hibit R-2A, RDT&E Project Justification: FY 2018 Army												
Appropriation/Budget Activity 2040 / 5					•	nent (Numb adar Develop	Project (E10 / Ser	(Number/Name) entinel					
C. Other Program Funding Summa	ary (\$ in Milli	ions)		'				,					
			FY 2018	FY 2018	FY 2018					Cost To			
<u>Line Item</u>	FY 2016	FY 2017	Base	OCO	<u>Total</u>	FY 2019	FY 2020	FY 2021	FY 2022	Complete	Total Cost		
 PE 0605052A: Proj EY7; 	-	83.995	175.069	-	175.069	149.506	52.300	24.700	-	0	485.570		
IFPC Increment 2 - Block 1													
 SSN C62001: INDIRECT FIRE 	-	-	57.742	-	57.742	157.406	144.740	100.400	14.600	Continuing	Continuing		
PROTECTION CAPABILITY,													
INC 2-1 Block 1 Missile 1													
 SSN C62002: INDIRECT FIRE 	-	19.319	-	-	-	31.641	191.830	315.025	277.500	Continuing	Continuing		
PROTECTION CAPABILITY,													
INC 2-1 Block 1 System													
 SSN C62004: IFPC 	-	-	-	-	-	-	-	-	12.300	Continuing	Continuing		
Inc 2-I Block 2 Missile													
 PE 0605457A: Proj S40, 	222.074	272.811	336.420	-	336.420	290.250	190.600	117.470	64.510	Continuing	Continuing		
Army Integrated Air and													
Missile Defense (AIAMD)													
 SSN BZ5075: IAMD 	20.917	204.969	-	-	-	-	326.928	387.026	513.464	Continuing	Continuing		
Battle Command System													
 PE 0604741A: Proj 126, 146, 	33.619	61.532	28.726	-	28.726	28.320	14.638	8.674	-	0	175.509		
149; Air Defense C2I Eng Dev													
 SSN AD5070: Air & MSL 	28.176	126.539	26.635	9.100	35.735	17.960	6.366	32.397	-	0	247.173		
Defense Planning & Control Sys													

Remarks

Army

This program is an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

D. Acquisition Strategy

Sentinel was procured from Raytheon Command and Control Solutions, LLC, formerly known as Thales Raytheon Systems (TRS), as a non-developmental item. Raytheon Command and Control Solutions owns the Technical Data Package (TDP) for the Sentinel A3 and its predecessors and therefore no other contractor has the technical ability to modify the Sentinel radar or Sentinel software. The modifications planned for the Sentinel that fall into this category are: Cross Domain Solution, Electronic Attack/Electronic Protect, Signal Data Processor/North Finding Module, Medium Bandwidth, and Mode S. For the Active Electronically Scanned Array, the product office will issue a new contract to develop a modified Sentinel with a new Active Electronically Scanned Array (AESA) antenna.

Cross Domain Solution Interface (Sentinel A3): The Sentinel Product Office will contract with Raytheon Command and Control Solutions to develop an interface solution to isolate Sentinel transmission from connected networks of lower classifications.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (N	umber/Name)
2040 / 5	PE 0604820A I Radar Development	E10 / Sent	inel

Electronic Attack/Electronic Protect (EA/EP) (Sentinel A3): The Sentinel Product Office will contract with Raytheon Command and Control Solutions to verify the initial EA/EP Database and update the database, software and hardware with more extensive EA/EP signatures to address evolving threats. The updated database will be tested, documented and released for installation.

Signal Data Processor (SDP)/North Finding Module (NFM) Obsolescence (Sentinel A3): The Sentinel Product Office will contract with Raytheon Command and Control Solutions to upgrade and mitigate the Signal Data Processor and North Finding Module issues. The updated SDP and NFM hardware will be tested, documented and released for installation in the field.

Medium Bandwidth Waveform (Sentinel A3): The Sentinel Product Office will contract with Raytheon Command and Control Solutions to address latent tracking issues that currently exist with Sentinel in certain applications. The effort modifies firmware as well as software in the Sentinel radar. The updated medium bandwidth waveform software and firmware will be tested, documented and released for installation in the field.

Mode S (Sentinel A3): The Sentinel Product Office will contract with Raytheon Command and Control Solutions to address Sentinel's objective requirement to interrogate Identification Friend or Foe (IFF) mode S on board commercial aircraft. The updated software will be tested, documented and released for installation in the field.

Active Electronically Scanned Array (AESA) (Sentinel A4): The Sentinel Product Office will award a new contract to develop the new AESA antenna to be integrated with the existing Sentinel A3 hardware and software. The CMDS Product Office will support requirement documentation and conduct design analysis to include analysis of technology, decision review preparation, and contract package development for acquisition of the AESA antenna to upgrade the current Sentinel A3. The software and hardware will be tested, documented and released for installation in the field.

Sentinel Systems (Sentinel A3): The Sentinel Product Office will contract with Raytheon Command and Control Solutions for risk reduction efforts in the development of the software package to support the identification and engagement of Low Slow Small target sets. The Sentinel Product Office will work with Other Government Agencies to finalize integration and test of the IAMD B Kit on board the Sentinel platform and to add simulation capability to allow a high fidelity representation of Sentinel to IAMD.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army

Date: May 2017

Appropriation/Budget Activity R-1 Program Element (Number/Name) Project (Number/Name)

2040 / 5 PE 0604820A / Radar Development E10 / Sentinel

Management Service	Management Services (\$ in Millions)			FY 2	2016	FY 2	FY 2017		FY 2018 Base		2018 CO	FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
Electronic Attack/ Electronic Protect	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	-		0.427	Nov 2016	-		-		-	0.000	0.427	0.000
Signal Data Processor North Finding Module	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	-		0.127	Nov 2016	-		-		-	0.000	0.127	0.000
Medium Bandwidth Waveform	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	-		0.215	Nov 2016	-		-		-	0.000	0.215	0.000
Active Electronically Scanned Array (A4)	Various	Cruise Missile Defense Systems Project Office : Huntsville, AL	0.000	-		0.591	Nov 2016	-		-		-	0.000	0.591	0.000
Management Support	Various	Cruise Missile Defense Systems Project Office : Huntsville, Al	0.450	1.048	Nov 2015	-		2.841	Nov 2017	-		2.841	Continuing	Continuing	0.000
		Subtotal	0.450	1.048		1.360		2.841		-		2.841	-	-	0.000

Product Development (\$ in Millions)			FY 2	2016	FY 2	11 = 11		FY 2018 FY 2018 OCO Total							
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
Cross Domain Solution Network Interface / Cyber Security	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	0.210	2.401	Jan 2016	-		-		-		-	0.000	2.611	0.000
Electronic Attack/ Electronic Protect	Various	Raytheon Command and Control Solutions, LLC &	1.994	2.885	Jan 2016	4.179	Jan 2017	7.777	Jan 2018	-		7.777	Continuing	Continuing	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army

Appropriation/Budget Activity

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R-1 Program Element (Number/Name)
PE 0604820A / Radar Development

Project (Number/Name)
E10 / Sentinel

Product Developme	nt (\$ in Mi	illions)		FY 2	2016	FY 2	2017	FY 2 Ba	2018 ise	FY 2	2018 CO	FY 2018 Total	Total Cost Cost To Complete Cost - 0.000 4.66 0.222 0.000 1.86 12.024 Continuing Continuin		Target
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			Target Value of Contract
		Various : Fullerton, CA / Various													
Signal Data Processor/ North Finding Module	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	1.245	2.353	Jan 2016	1.071	Jan 2017	-		-		-	0.000	4.669	0.000
Medium Bandwidth Waveform	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA	0.000	0.943	Jan 2016	0.702	Jan 2017	0.222	Jan 2018	-		0.222	0.000	1.867	0.000
Active Electronically Scanned Array (A4)	Various	Cruise Missile Defense Systems : TBD and Huntsville, AL	0.000	-		7.095	Jan 2017	12.024	Jan 2018	-		12.024	Continuing	Continuing	0.000
Mode S	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	0.000	-		-		1.838	Jan 2018	-		1.838	Continuing	Continuing	0.000
System of Systems	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	0.000	-		-		4.900	Jan 2018	-		4.900	0.000	4.900	0.000
		Subtotal	3.449	8.582		13.047		26.761		_		26.761	_	_	0.000

Test and Evaluation	(\$ in Milli	ons)		FY 2	2016	FY 2	2017	FY 2 Ba	2018 se	FY 2	2018 CO	FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Cross Domain Solution Network Interface / Cyber Security	Various	Raytheon Command and Control Solutions, LLC &	0.000	0.832	Jan 2016	-		-		-		-	0.000	0.832	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army

Appropriation/Budget Activity

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R-1 Program Element (Number/Name)
PE 0604820A / Radar Development

Ptoject (Number/Name)
E10 / Sentinel

Test and Evaluation	(\$ in Milli	ions)		FY 2	2016	FY 2	2017	FY 2 Ba	2018 se	FY 2	2018 CO	FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Various : Fullerton, CA / Various													
Electronic Attack/ Electronic Protect	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	0.163	0.300	Jan 2016	0.907	Jan 2017	1.138	Jan 2018	-		1.138	Continuing	Continuing	0.000
Signal Data Processor North Finding Module	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	0.000	0.781	Jan 2016	0.324	Jan 2017	-		-		-	0.000	1.105	0.000
Medium Bandwidth Waveform	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	0.000	0.278	Jan 2016	0.345	Jan 2017	0.151	Jan 2018	-		0.151	0.000	0.774	0.000
Mode S	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	0.000	-		-		0.516	Jan 2018	-		0.516	Continuing	Continuing	0.000
System of Systems	Various	Raytheon Command and Control Solutions, LLC & Various : Fullerton, CA / Various	0.000	-		-		1.561	Jan 2018	-		1.561	0.000	1.561	0.000
		Subtotal	0.163	2.191		1.576		3.366		-		3.366	-	-	0.000

_												
												Target
	Prior					FY 2018	FY:	2018	FY 2018	Cost To	Total	Value of
	Years	FY 2	2016	FY 2	2017	Base	0	CO	Total	Complete	Cost	Contract
Project Cost Totals	4.062	11.821		15.983		32.968	-		32.968	-	-	-

Remarks

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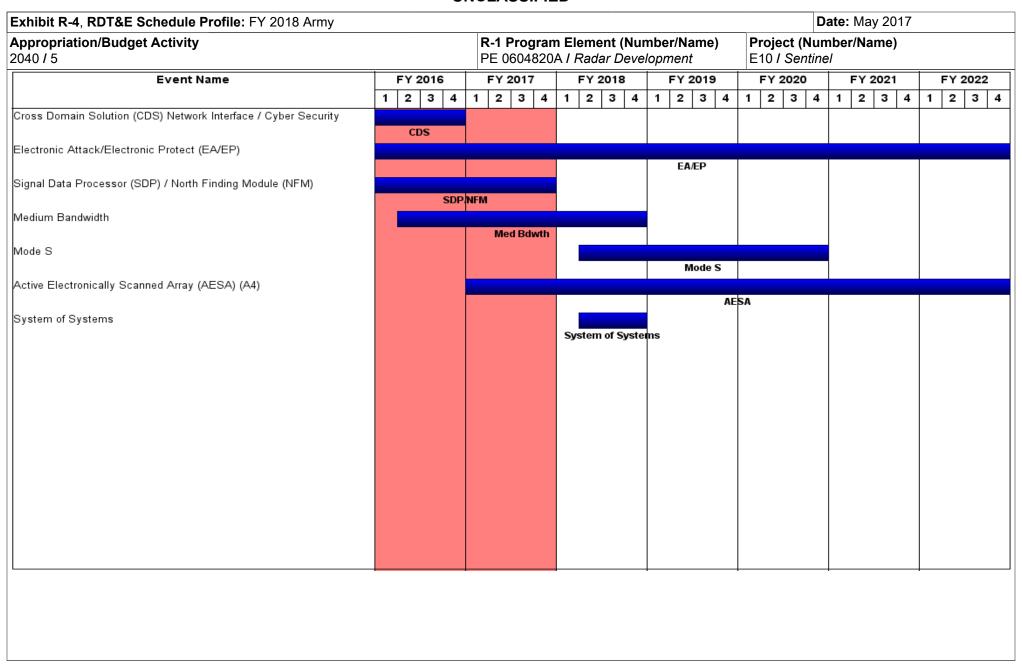


Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity	` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `	, ,	umber/Name)
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Schedule Details

	St	art	E	nd
Events	Quarter	Year	Quarter	Year
Cross Domain Solution (CDS) Network Interface / Cyber Security	2	2015	4	2016
Electronic Attack/Electronic Protect (EA/EP)	2	2015	4	2022
Signal Data Processor (SDP) / North Finding Module (NFM)	2	2015	4	2017
Medium Bandwidth	2	2016	4	2018
Mode S	2	2018	4	2020
Active Electronically Scanned Array (AESA) (A4)	1	2017	4	2023
System of Systems	2	2018	4	2018